Short-Run Money Growth Fluctuations and Real Economic Activity: Some Implications for Monetary Targeting

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THERE is ample evidence that the rate of inflation is directly related to the long-term growth of the money supply. Indeed, this relationship has been demonstrated for various countries.[1] The implication of this finding is that the control of money growth over the long term is vital to the control of inflation, a realization that undoubtedly helps to explain the fairly recent announcements of monetary growth targets in most of the major industrial countries.[2]

Although the money growth/inflation connection is fairly well-documented, the relationship between short-run movements in money growth and economic activity is less well-known. Even though this connection has been demonstrated for the United States, its general applicability has not been tested.[3] The purpose of this article, therefore, is to investigate the relationship between short-run movements in the growth of the money stock and fluctuations in real economic activity.[4] Although the evidence presented in this article is not derived from a rigorous empirical analysis, it indicates quite convincingly that virtually every downturn in economic activity in recent years in each of the countries examined was preceded by a significant reduction in the growth of its narrowly defined money supply.

MONEY AND ECONOMIC ACTIVITY: THE THEORY

There is little disagreement that significant changes in the growth of the money supply influence economic activity. Changes in the *long-term* growth of money, measured by some moving average of money growth over a number of years, affect the rate of inflation. Indeed, several empirical studies of the United States indicate that it may take as long as five years for the rate of inflation to reflect completely the impact of a change in money growth.[5] More recent

[1]Dallas S. Batten,"Money Growth Stability and Inflation: An International Comparison," this *Review* (October 1981), pp. 7-12. See also Richard T. Selden, "Inflation and Monetary Growth: Experience in Fourteen Countries of Europe and North America Since 1958," Federal Reserve Bank of Richmond *Economic Review* (November/December 1981), pp. 19-35.

[2]Of the Group of Ten countries plus Switzerland, only two, Belgium and Sweden, do not formally announce monetary growth targets of some kind. See Organization for Economic Co-operation and Development, *Monetary Targets and Inflation Control* (Paris:OECD, 1979).

[3]Milton Friedman and Anna J. Schwartz, "Money and Business Cycles," *Review of Economics and Statistics* (February 1963), pp. 32-78; William Poole, "The Relationship of Monetary Decelerations to Business Cycle Peaks: Another Look at the Evidence," *Journal of Finance* (June 1975), pp. 697-712; and Leonall C. Andersen and Keith M. Carlson,"A Monetarist Model for Economic Stabilization," this *Review* (April 1970), pp. 7-25.

[4]The evidence presented also sheds light on the debate about the impact of M1 growth during periods of financial innovation and institutional change. By examining the connection between short-run fluctuations in M1 growth and real economic activity across countries with different financial institutions and regulations, some understanding of the relationship's robustness in a changing financial environment may be gained. For a good example of the uncertainty that pervades current thinking on the future efficacy of targeting on M1, see Anthony M. Solomon, "Financial Innovations and Monetary Policy," Federal Reserve Bank of New York, *Annual Report, 1981* (1982), pp. 3-17; and Edward Yardeni, E. F. Hutton *Economics Alert* (January 29, 1982).

[5]See Denis S. Karnosky, "The Link Between Money and Prices — 1971-76," this *Review* (June 1976), pp. 17-23; Keith M. Carlson, "The Lag From Money to Prices," this *Review* (October 1980), pp. 3-10; and John A. Tatom, "Energy Prices and Short-Run Economic Performance," this *Review* (January 1981), pp. 3-17.

studies also have demonstrated that a lengthy lag between money growth and inflation is common in several industrial countries.[6] This evidence indicates that changes in current money growth have a relatively small impact on prices *in the short run.*

For short-run changes in money growth to affect economic activity, they must initially influence the real economy more significantly than they influence prices.[7] Indeed, studies have shown that, at least for the United States, sizable reductions in money growth below its established trend rate for only a few quarters have preceded declines in real economic activity.[8]

The economic theory that "predicts" the results just described is as intuitively appealing as it is empirically verifiable. A marked and sustained decline in the growth of the money supply creates a "monetary disequilibrium": the quantity of money that individuals desire to hold exceeds the quantity that they are actually holding. By reducing their spending, they can increase their money holdings to a desired level. Eventually, this reduced spending will cause the rate of inflation to fall.

In the short run, however, producers who cannot tell immediately whether this decline in aggregate demand (spending) is permanent or just a temporary aberration initially react to the reduction in money growth (and spending) by reducing output. Therefore, the decline in money growth results in a slowdown in economic activity; if it is pronounced enough and sustained long enough, it can produce a recession. Only when the decline in spending (motivated by the monetary disequilibrium associated with the reduction in money growth) has been identified as *permanent* will producers reduce their prices and increase production back to "normal" levels. Thus, the impact of the monetary contraction on output eventually vanishes, and, in the long run, only the rate of inflation is affected by a sustained reduction in money growth.[9]

The potential usefulness of monetary targeting for economic policy purposes is evident from this discussion. First, in the long run, permanent changes in the rate of money growth are reflected by equivalent changes in the rate of inflation, other things equal. Second, if short-run money growth is volatile, the growth of real output and employment will be similarly volatile. In other words, sufficiently unstable money growth in the short run, that is, a reduction in money growth relative to its trend rate, may cause recessions. Consequently, minimizing the variability of short-run money growth appears to be essential in establishing a stable, non-inflationary environment for economic growth.

SHORT-RUN MONEY GROWTH AND ECONOMIC ACTIVITY: THE EVIDENCE

We now investigate the validity of the conceptual analysis presented in the preceding section. To examine the relationship between short-run fluctuations in money growth and real economic activity, a sample of four industrialized countries was selected: the United States, the United Kingdom, West Germany and Italy. Moreover, to make the results of the analysis directly comparable, the narrow definition of money for each country is used.[10]

To illustrate the relationship between *short-run* money growth and real output growth, charts for each country are presented for the period 1973 to the present.[11] These charts depict the deviations of short-run money growth from its trend, measured by subtracting the 20-quarter moving average growth rate of money from its two-quarter moving average growth rate. In addition, the quarter-to-quarter, compounded annual rate of growth of real GNP is

[6]Batten, "Money Growth Stability and Inflation;" and also Selden, "Inflation and Monetary Growth."

[7]This article discusses *only* the impact of changes in money growth on the real output of the economy. It does not investigate the impact of money growth changes on financial markets.

[8]Poole, "The Relationship of Monetary Decelerations to Business Cycle Peaks." See also *Economic Report of the President* (Government Printing Office, 1982), pp. 192-96, for another use of the theory presented here.

[9]The empirical problem here, of course, is dating the "long run."

[10]The M1 definition is used throughout. It should be noted that even though the narrow definition is used, it is not the variable used by all the central banks in their policy deliberations. The countries and their respective monetary target(s) are: United States (M1, M2), United Kingdom (Sterling M3), Germany (Central Bank Money Stock) and Italy (Total Domestic Credit).

[11]The period since 1973 is used for two reasons. First, it is characterized as a flexible exchange rate period, a condition giving each country more control over its own domestic money supply and, hence, economic activity than in a fixed exchange rate period. While the analysis also applies to a fixed exchange rate period, economic activity of open economies during such a period may merely reflect economic activity in the United States. Consequently, we chose the post-1973 period because we are concerned with examining the impact of changes in short-run money growth that are motivated by changes in factors indigenous to the domestic economy. Second, this period covers the time in which each country's central bank announced a monetary aggregate policy target. Prior to 1973, announced money supply growth targets were not universal.

plotted. Periods in which real output growth was negative for two consecutive quarters or more are denoted by the shaded areas; these designate periods of recession in these countries.[12]

The individual charts reveal that there is a common relationship between sharp reductions in the short-run growth of money (the two-quarter moving average) relative to its trend (the 20-quarter moving average) and real economic activity.[13] Despite the wide differences among these countries in terms of their financial structures, regulations and monetary policy objectives, the relationship between short-run deviations in their money growth from trend and declines in their real economic activity is quite similar. To see this more clearly, we briefly examine the historical record of each country in our sample.

The United States

The chart for the United States reveals three recessions since 1973. As predicted by the theoretical discussion, each recession was preceded by a sharp slowing in short-run money growth. Prior to the 1974 recession, for example, short-run money growth fell from slightly over 2 percentage points above trend to about 2 percentage points below trend, a change that is mirrored in the reduction in real GNP growth in 1973. While one may argue that the recession of 1974 was supply-oriented — a reaction to the unexpected OPEC oil shock — the chart indicates that the depth and breadth of the downturn was exacerbated by short-run money growth well below trend in late 1974.[14]

The most recent downturns in economic activity also are associated with declines in short-run money growth. For example, prior to the onset of the II/1980-III/1980 recession, money growth fell from about 3 percentage points above trend to over 4 percentage points below trend. Although money growth's sharp rebound during late 1980 helped produce the turnaround in real GNP growth in early 1981, the equally dramatic downturn in money growth relative to trend during 1981 has precipitated yet another reduction in real economic activity. Indeed, since I/1980, short-run money growth has fallen short of trend almost 90 percent of the time, and real GNP growth has been negative almost 40 percent of the time. Clearly, the dramatic slowing in short-run money growth relative to its long-run trend and the increase in its volatility during the past two years have been associated with substantial reductions in real economic activity over this period.

The United Kingdom

The accompanying chart indicates that the United Kingdom has experienced a number of "recessions" during the brief period studied. Of the six recessions shown, all but one were preceded by sharp reductions in short-run money growth. For instance, prior to the IV/1973-I/1974 downturn, money growth fell from about 5 percentage points above trend to more than 10 percentage points below trend, a reversal of about 15 percentage points in less than one year. Likewise, the I/1977-II/1977 recession came on the heels of a drop in money growth to more than 5 percentage points below its trend.

The period since late 1978 is interesting because it reveals the effect on the economy of a sustained reduction in short-run money growth below its trend. Although money growth did not dip far below trend prior to the IV/1978-I/1979 recession, short-run money growth fell from over 15 percentage points *above* trend in IV/1977 to its trend level in only three quarters, a change that is associated with the drop in real GNP growth from IV/1977 to I/1979. Also, the impact of the nature of the money growth decline during the period from IV/1977 to I/1981 is reflected by relatively stagnant output growth during this period.

Finally, the IV/1974-III/1975 recession represents an anomaly to the theory. The recession was not preceded by a downturn in short-run money growth relative to its trend; instead, money growth increased faster than its trend rate prior to this reces-

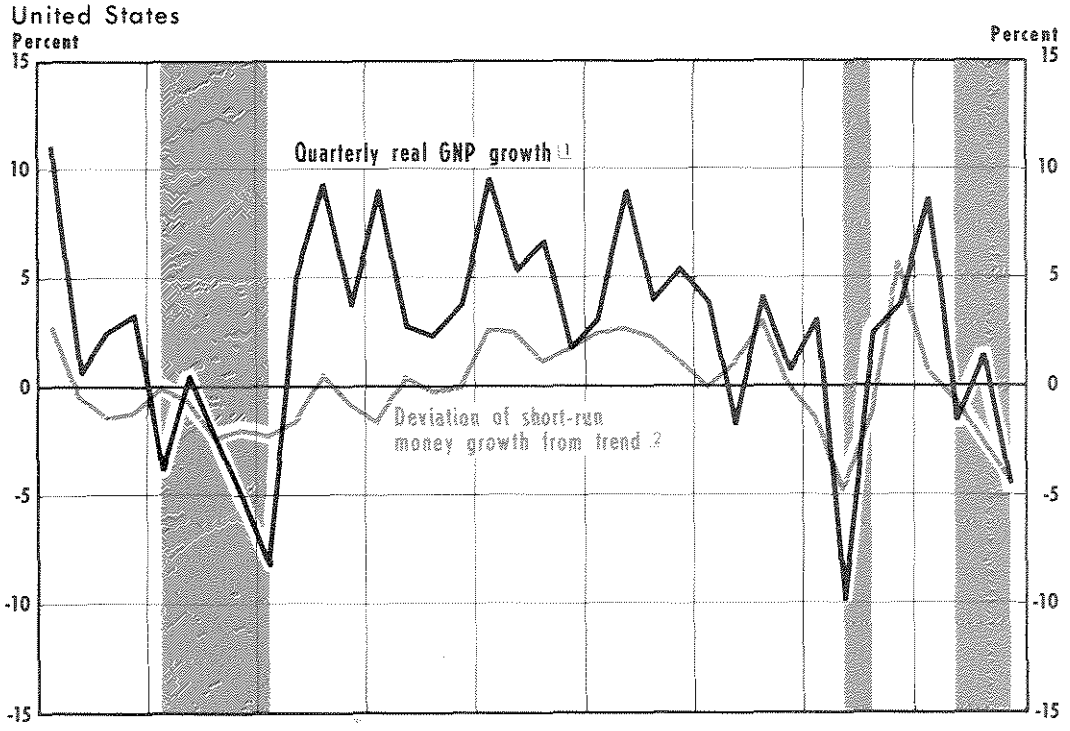
[12]The recessions in the United States are those defined by the National Bureau of Economic Research. Since recessions are not formally defined in the other countries in the sample, the generally accepted rule of thumb is that a recession is indicated by at least two consecutive quarters of declining real GNP.

[13]The purpose of this article is *not* to employ statistical methods to investigate rigorously the money/real output relationship in those countries. Instead, we are simply applying the general implications of the research that has been conducted for the United States to an analysis of these countries, as a first attempt to see if empirical relationships similar to those in the United States can be found. Obviously, the timing of the money growth/real output relationship may be different across countries and, in fact, the 20-quarter and two-quarter distinctions may not be completely applicable to all. These results, however, appear to be quite robust and, consequently, we shift to the unconvinced reader the obligation of an alternative interpretation of the data.

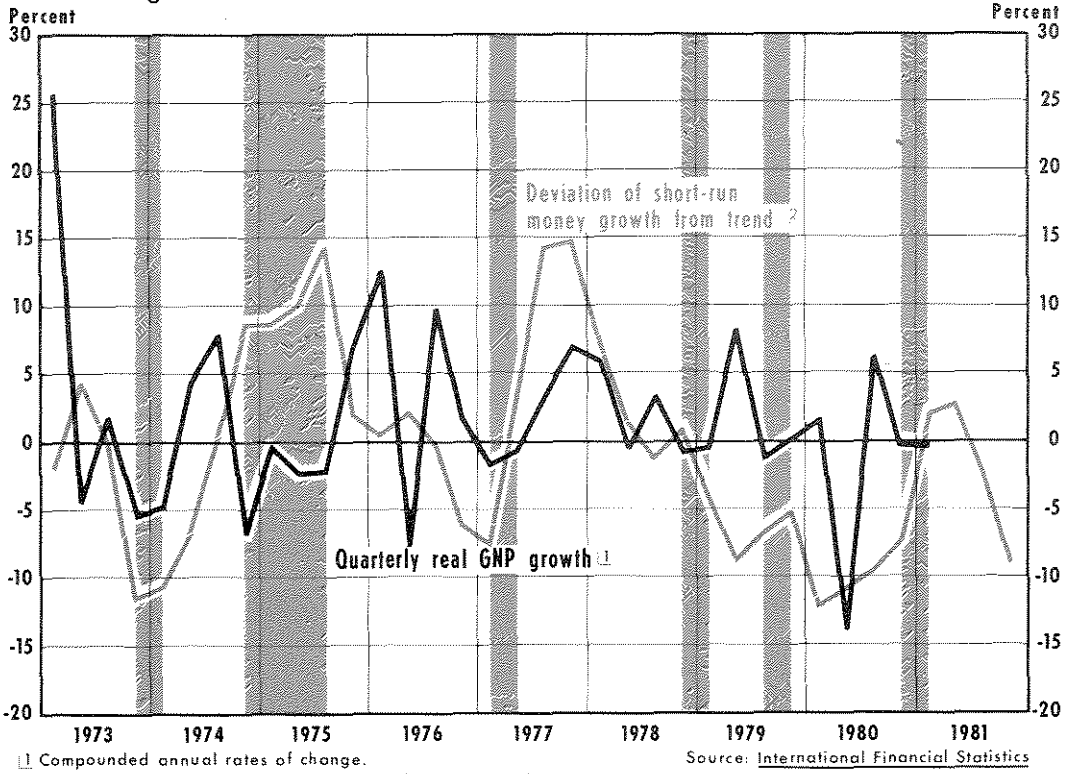
[14]The oil price shocks of 1973-74 and 1979-80 resulted in dissimilar monetary growth rates in the United States. For a discussion of this, see R. W. Hafer, "The Impact of Energy Prices and Money Growth on Five Industrial Countries," this *Review* (March 1981), pp. 19-26.

Money and Output Growth in Selected Countries

United States



United Kingdom



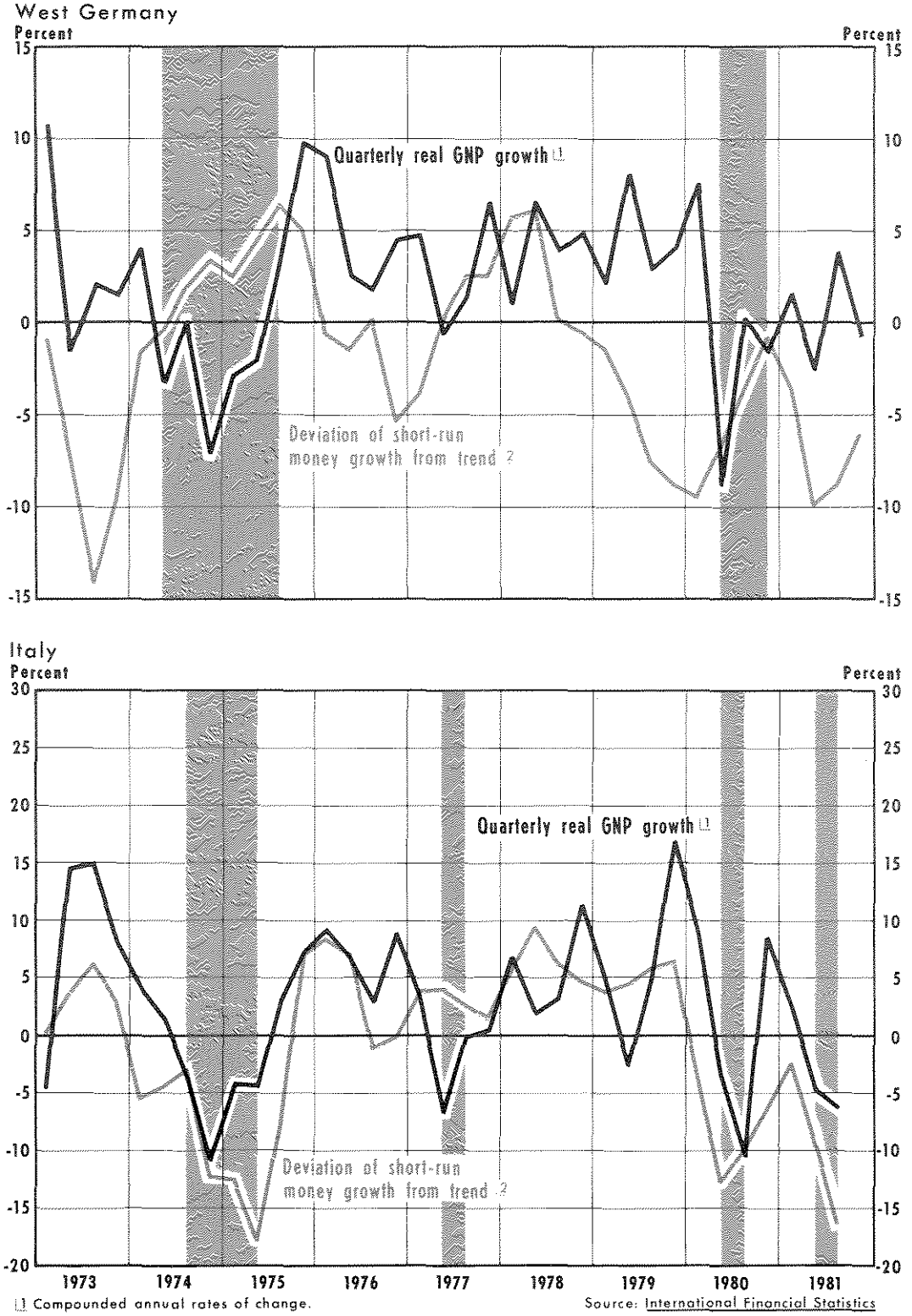
1 Compounded annual rates of change.

Source: International Financial Statistics

2 Two-quarter moving average money growth rate minus the 20-quarter moving average money growth rate.

Shaded areas represent periods of economic downturn.

Money and Output Growth in Selected Countries



1 Compounded annual rates of change. Source: International Financial Statistics

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sion. This may have been an attempt to use monetary policy to offset, at least partially, the dislocations created by the OPEC oil shock that lowered the growth of real GNP. Interestingly, the U.K. response to the 1978-79 OPEC oil shock was to decrease the short-run growth of the money stock, as shown in the chart.[15]

West Germany

The chart for West Germany again supports the theoretical discussion. Each of the two recessions is preceded by periods of money growth below trend. Although the timing is different for each episode, the reaction of the real economy to declines in short-run money growth is clear and consistent.

West Germany also presents a case in which money growth fell below trend and no technical recession occurred. From III/1975 to IV/1976, money growth fell from about 7 percentage points above trend to about 5 percentage points below trend. Although no recession followed, the level of real GNP growth fell sharply as the theory predicts: the growth rate of real GNP fell from about 10 percent in IV/1975 to zero in II/1977. Thus, while technically no recession followed the decline in money growth, real GNP growth was curtailed sharply, an example of a "growth recession."

Italy

The relationship between real GNP growth and money growth relative to trend in Italy, once again, is consistent with theoretical expectations. Of the three recessions since 1973, each was preceded by a period of sharp reductions in short-run money growth relative to its trend rate. This pattern is especially evident for the II/1974-II/1975 and II/1980-III/1980 recessions.

[15]Hafer, "Impact of Energy Prices and Money Growth."

CONCLUSIONS

The evidence presented here suggests that sizable and sustained reductions in short-run money growth below its trend rate portend declines in the growth of real GNP. Of the 14 recessions in the four countries examined, only one — the IV/1974-III/1975 recession in the United Kingdom — was not preceded by a substantial decline in short-run money growth. Moreover, in only one instance — the III/1975-IV/1976 period for West Germany — did short-run money growth fall substantially below trend without a recession following. In that instance, however, West German real GNP growth fell from about 10 percent to zero, a result consistent with the theoretical discussion.

Thus, the evidence indicates that policymakers should be concerned with short-run fluctuations in the growth of the money supply relative to its trend.[16] If this evidence is at all useful, it demonstrates how robust the relationship between money growth and real economic activity is over the short run. Coupled with previously reported research indicating a direct, positive link between longer-term money growth and inflation, the empirical evidence favors a steady growth of the money stock in both the short and long run as the most effective means of achieving economic stability.

[16]This evidence contradicts the recent claim that "the [money growth] volatility issue itself is a hoax. No one as yet has been able to demonstrate that the reported volatility in money has any impact on either the pace of economic activity or inflation." Aubrey G. Lanston & Co., Inc., Newsletter (March 22, 1982).